A STUDY TO ASSESS THE EFFECTIVENESS OF DUAL TASK EXERCISES ON IMPROVING BALANCE AND GAIT PATTERN AMONG ELDERLY IN SELECTED OLD AGE HOMES AT KANYAKUMARI DISTRICT

A DISSERTATION SUBMITTED TO THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILMENT OF REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

OCTOBER -2018

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APPROVED BY THE DISSERTATION COMMITTEE ON:5/06/2017

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Submitted in partial fulfillment of the requirement for the degree of Master of Science in Nursing, the Tamil Nadu Dr. M.G.R Medical University, Chennai

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DECLARATION

I the investigator, II year M.Sc Nursing student of Christian College of Nursing, Neyyoor, hereby declare that this dissertation titled **"A study to assess the effectiveness of dual task exercises on improving balance and gait pattern among elderly in selected old age homes at Kanyakumari District",** has not been submitted by me, for the award of any degree, diploma, title or recognition before.

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CERTIFICATE

Certified that the thesis entitled **"A study to assess the effectiveness of dual task exercises on improving balance and gait pattern among elderly in selected old age homes at Kanyakumari District"** is a bonafide work by Mrs.V.Stalin Shiny, IIyear M.Sc Nursing student of Christian College of Nursing, Neyyoor submitted in partial fulfillment of requirement for the degree of Master of Science in Nursing under the Tamil Nadu Dr. M. G. R Medical University, Chennai.

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This is to certify that this dissertation entitled **"A study to assess the effectiveness of dual task exercises on improving balance and gait pattern among elderly in selected old age homes at Kanyakumari District"** is a bonafide work of Mrs.Stalin Shiny, II year M.Sc Nursing student from Christian College of Nursing, Neyyoor submitted in partial fulfillment of the University rules and regulations for the award of M.Sc Nursing under my guidance and supervision during the academic year 2017-2018.

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Oh, give thanks to the lord for he is good, for his mercy endures forever.

-Holy bible

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ABSTRACT

INTRODUCTION

Many of the elderly were affected by balance and gait problems. Dual task exercises helps to improve balance and gait pattern. The aim of the study was to assess the effectiveness of dual task exercises to improve the balance and gait pattern among elderly in selected old age homes at Kanyakumari district.

METHODS

One group pretest post-test pre experimental design was adopted for the study. Thirty elderly with balance and gait problem were selected using purposive sampling techniques as samples. Data was collected on the 1st and 7th day by using interview schedule and Berg Balance Scale and Functional Gait Assessment Scale. Four session of training was provided.

RESULTS

The pretest mean berg balance score was 17.9±2.5 and the post- test score was 52.4±2.3. The mean difference was high and “t” value was 53.227 which was statistically significant. The pretest mean functional gait assessment score was 12.0±3.3 and the post- test score was 28.4±2.2. The mean difference was high and the “t” value was 20.756 which was statistically significant. There is a no significant association found between the pretest level of balance and gait pattern with demographic variables like age, gender, education, occupation, marital status, exercise pattern and health information medias, does not show any significant association.

CONCLUSION

Dual task exercises helps to improve their balance and gait pattern among elderly.

KEYWORDS

Effect, dual task exercises, elderly,gait,balance.

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CHAPTER – I

INTRODUCTION

"The strength of the elderly is in the ears and on the lips"

(Anonymous)

Old age refers to ages nearing or surpassing the life expectancy of human beings and is thus the end of the human life cycle. The other terms used are old age people, seniors, senior citizens, older adults, the elderly and elders. Old people often have limited regenerative abilities and sickness than younger adults. The organic process of aging is called senescence.

The medical study of the aging process is called gerontology and the study of disease that affects the elderly is called geriatrics. The elderly also face other social issues around retirement include loneliness and ageism. The old age is not a definite biological stage, as the chronological age. Old age varies culturally and historically. In 2011, the United Nations proposed a human rights convention that would specifically protect older persons. Elderly as a person who is of age 60 years or above as per maintenance and welfare of parents and senior citizens act 2007. Government of India adapted national policy on older persons in January 1999. The policy defines senior citizens or elderly as a person who is of age 60 years or above. According to population censes 2011 there are nearly 104 million elderly persons living in India. International day of elderly people celebrated at Sunday of October 1st highlight the important contribution that older people make to society and raise awareness of the issues and challenges of aging in today's world, (WHO 2016).

Older comprises the later part of life, the period of life after youth and middle age, usually with reference to deterioration. Most developed world countries have accepted the chronological age of 65 years as an accepted definition of elderly or older persons. Study of old age in Africa the world health organization set 50 as the beginning of old age. Most developed western countries set the age of 60 to 65 for retirement (WHO 2010). India needs to devise appropriate social and economic policies to allow the rapid increase in the number of elderly who will make as much as fifth of the population by the middle of this century.

Although India will be the youngest country in the world by 2020 with the median age of 29 years, the number of elderly people likely to increase significantly after that, According to 2014 state of elderly in India are divided in to three categories the young old (60-70) the middle aged old (70-80) and the oldest old (80 plus). The report revealed that among the elderly the greatest expectation from the state is that of free treatment followed by health care, Out of the oldest old, 71% stay with their sons. The older people face problems of health and disability and financial constraints with inadequate pension and retirement funds. The elderly faces a number of problems including stroke, dementia, social care needs or a combination of both.

Old age is when a person is old and near the time when he or she dies. These people are usually retired from work and spend their time in other ways like helping take care of small. The reason for this is that bodies are slowly deteriorating so they have more problems especially with moving. The elderly population in India is continuously increasing and also the problems faced by these people are increasing simultaneously. The most of the people in old age facing problems likes lack of care,

emotional support and economic support from the family etc. Some laws are enacted to solve this problem. According to the mentality of people here, they do not bother to follow moral duties but they have to follow legal duties because of fear of punishment. Appropriate mechanism to be set up to provide need based maintenance to the parents and senior citizens.

Gait and balance disorders are common in older adults and are a major cause of falls in this population. At least 30% of older report difficulty walking (Salman 2010). A balance disorder is a disturbance that causes an individual to feel unsteady for example when standing, or walking. It may be accompanied by feeling of giddiness or wooziness or having a sensation of movement, spinning, or floating. About one third of the older population reports difficulty with balance and walking and the numbers increase significantly after the age of 75 years. Men and women are affected equally.

Decline in gait speed appears as one of the most consistent age associated changes slower walking of older adults was related to fear of fall, muscle weakness and impairment of motor control (Seung UK 2010) Kitazawa has suggested that aerobics or strength exercises may be challenging for older adults. Therefore it is necessary to consider the types and levels of physical activities suited for them to improve their cognitive and gait function and prompted efforts to identify exercises that require less physical strength and frequency of performance while still offering cognitive and health benefit. Regular exercises help to improve the flexibility of the body and improve the strength of the muscles and joints. Exercises can give energy to sleep better, make your bones and muscles stronger and prevents from the balance

and gait problem. Gait or balance impairment increases with age. Community dwelling older adults of age 70 and older had a prevalence of gait disorders of 35%.

NEED OF THE STUDY

Walking is a common activity of daily living and at the same time, it is very complex. It involves all levels of the nervous system and many parts of the musculo-skeletal system. A person's gait pattern is strongly influenced by age, personality and mood. The prevalence of gait and balance disorders markedly increase with age around 10% between the ages of 60 and 69 years to more than 60% in those above 80years.

Gait impairment may greatly affect the quality of life and restrict the personal independence of those affected. More over balance and gait problem may be precursors of falls which are the most common cause of severe injuries in the elderly. Walking is a sensitive indicator of overall health status and the self-walking speed closely correlates with individual life expectancy in elderly persons. Nevertheless, gait disorders and falls are largely under diagnosed and often receive inadequate evaluation. The causes of gait disorders include neurological conditions (e.g. stroke and Parkinson's disease) and medical condition (e.g. heart failure) respiratory insufficiency, peripheral arterial occlusive disease and obesity).

In older age, gait disorders typically have several causes, which may include impaired proprioceptive function in polyneuropathy, poor vision, functional gait disorder associated with vascular encephalopathy and osteoarthritis of the hips or knees. If a gait disorder has an acute onset, cerebrovascular, spinal and neuromuscular causes should be considered. In elderly persons preexisting

difficulties with walking and balance are more commonly the causes of falls than acute disturbance such as syncope, seizures or stroke. Almost one third of all persons over the age of 65years fall every year, and more than half of those fall more than once. Approximately 10-15% of these falls lead to serious injuries, such as traumatic brain injury or hip fractures. It has been estimated that inadvertent injuries are the fifth most common causes of death in elderly persons.

At least 30% of persons among 65 and older have difficulty in walking three city blocks or climbing one flight of chairs. Approximately 20% require the use of mobility aids to ambulate in a sample of non-institutionalized older adults. 35 % were found to have an abnormal gait. The prevalence of abnormal gait increases with age and is higher in persons in the hospital settings and in those living in long term facilities. Gait disorders were detected in approximately 25% of persons between the age of 60 and 74 years and nearly 60 % of those between 80 and 84 years of age.

After the age of 50 years, we begin to lose 10% of our strength per decade of life which can lead to elderly balance problems. Daily balance exercises can help reduce the rate of decline. Many older adults will not have balance changes due to aging but also experience decline because of medical condition such as vascular degeneration, cataract and peripheral neuropathy. In these cases, it is vital to continue to work on improving the balance by daily exercise. The use of dual task training paradigm to enhance postural stability in patients with balance impairment is an emerging area of interest. The differential effects of dual task and dual task training on postural stability still remain unclear.

Gait disorders are common in the general elderly population and are associated with reduced mobility. Neurological gait disorders are associated with recurrent falls, lower cognitive functions, depressed mood and diminished quality of life. Study has conducted on gait and cognition in older adult. The prevalence of abnormal gait using Bronx Whorl classification was 35.0%. Incidence of abnormal gait was 168.6 per 1000 person per *y*ears (Anne F.Ambrose 2010). In India the geriatric population is expected to increase from 76.6 million in 2006 to 1731.1 in 2026.This segment of the population faces multiple problems in India. Falls are considered one of the more serious problems among this group. Falls are the important cause of mobility disorder in the elderly and are a marker of poor physical and cognitive status (WHO global report 2015).

Gait and balance problems are common with advancing age. Disorders of balance and gait increase the risk of falls and injury (Viswanathan 2012). A person's gait pattern is strongly influenced by age, personality and mood. The prevalence of gait and balance disorders markedly increases with age from 10% between the age of 60 and 69 years more than 60% after that Gait impairments may greatly affect the quality of life and restrict the personal independence of those affected. Moreover balance and gait problems may be precursors of falls which are the most common cause of severe injuries in the elderly (Wpirker 2017).

Dual task exercise is most important for elderly with balance and gait patterns problem. It improves the strength and tones of the muscles and controls the knee and helps to stabilize and protect your knee joint. Dual task exercise helps to improve cognitive function, standing and walking (Yokoyama 2015). From experience it was noticed that the balance and gait problems are common in elders.

But there is only limited studies related to dual task exercise. Literature shows that dual task exercises are effective in treating problems with gait pattern. So the investigator planned to conduct a study to assess the effectiveness of dual task exercise on improving balance and gait pattern among elderly.

PROBLEM STATEMENT

A study to assess effectiveness of dual task exercises on improving balance and gait pattern among elderly in selected old age homes at Kanyakumari district.

Objectives of the study

1. To assess the pre and post-test level of balance and gait pattern among elderly.
2. To compare the pretest and post-test level of balance and gait pattern among elderly.
3. To associate selected demographic variables with pretest level of balance and gait pattern among elderly.

Hypotheses

H1: There will be significant difference between the pre and post test level of balance and gait pattern among elderly.

H2: There will be significant association between selected demographic variables with pretest level of balance and gait pattern among elderly.

OPERATIONAL DEFINITION

Effectiveness

Effectiveness means doing the right thing" and producing an intended result. In this study refers to the expected outcome such as improving balance and gait pattern which was measured used Berg Balance Scale and Functional Gait Assessment Scale respectively.

Dual task Exercise

Dual task is defined as the ability to perform two or more cognitive and motor activities simultaneously while maintaining postural control.

In this study dual task exercise refers to the activities which were taught to the elderly to improve their gait and balance including walking, counting the numbers while forward walking, counting the numbers while backward walking, walking between obstacles, Figure of eight walking.

Balance

Balance is the steadiness, stability and equilibrium.

In this study, balance refers to the ability of the elderly to maintain stable position without falling which was assessed by using Berg Balance Scale.

Gait pattern

A pattern of walking or moving on foot.

In this study gait refers to the pattern of walking which was assessed by using Functional Gait Assessment Scale.

Assumption

1. Balance and gait problems are the most common problems in elderly.
2. Dual task exercise increase blood flow to the feet and help to reduce balance and walking disability.
3. Dual task exercises reduce swelling and improve movement of joint in the knees and ankles.

Limitation

1. Sample size was to only 30.
2. Data collection was only to six weeks.

CHAPTER - II

REVIEW OF LITERATURE

Research often undertakes a literature review to familiarize with knowledge base for both qualitative and quantitative researches. A literature review is important for developing a broad conceptual context in to which a research problem will fit. The comparison often a good point of departure for suggesting new research either to resolve conflicts or to extend the base of knowledge (Denise F. polite, Bernadette, 1995).

Literature relevant to the study is reviewed and presented under the following headings.

Literature review related to balance

Zanotto .T et al, (2014) conducted a study on to investigate the effect of dual task and balance on elderly disease condition.Investigations on how exercise and physical activity affect dual task performance in the fact that Dual task activities are common place with activities of daily living. Hence the objectives of this study was to critically review the existing and improvement of static and dynamic balance during DT conditions as well as secondary outcomes in elderly subjects with different disease conditions. A systematic search using online databases was performed to source documents. Inclusion criteria sourced articles classified as randomized controlled trails, controlled trials (CT) and uncontrolled trials. (UT) as well as postural control and executive function. There was no significant change in Dual task across all measurement, except for the cognitive task of the TUG.

Mazzetti.S. A et al, (2010) conducted study on to investigate comparing the effects of balance training with and without cognitive tasks on the quality of life and balance performance in community dwelling older adults. Aging process can deteriorate the ability to maintain balance specifically under dual task conditions. Twenty four older adults over 60 years old were allocated randomly in to single task (n=12) and dual task (n=12) exercise groups .single task groups received routine balance exercise, over a four weeks period and dual task group was treated by the same exercise program plus a cognitive task. QOL and balance status were assessed by the short form health (37-36) and Fullerton. Advanced balance scale questionnaires, before and after intervention. Balance exercise under intervention. Balance exercises under both single and dual task conditions can improve the balance level and some aspects of QOL in older adults with mild balance impairments with no priority of one group over another.

Bing.L et al, (2010) conducted study on to investigate the effect of traditional Chinese exercise on gait and balance for stroke. Studies are obtained from pub med, embase, Cochrane library, Ebsco, web of science and CNHL. Only randomized controlled trials were left to evaluate to evaluate of traditional Chinese exercise for patients with stroke and with no limits on study data or language. The primary outcome was the berg balance score, functional walking scale and a random effects model was used to calculate the pooled mean difference with 95% confidence interval. A total of 9 studies on 820 participants conform the inclusion criteria. Whereas eight studies on 704 participants are used as data sources of the Meta analysis, all trials were published between 2004 and 2013. The BBS indicates that the efficacy of traditional Chinese on balance of patient with stroke is better than

that of other training or no training in short term (MD 95%CL= 11.85,P,<0.0001). Studies had to include a physical exercise intervention protocol and measure gait parameters during continuous unobstructed walking in single and dual task conditions before and after the intervention, Fourteen RCTS were included in Meta analysis. The mean difference between the intervention and control groups significantly favored the intervention for single task gait speed (mean difference 0.06 /mls.95% cl: 0.03, 0.10 p<0.001) dual task gait speed and DTC on gait speed. Evidence from subgroup comparison showed no difference in treatment related changes between cognitive motor dual task and when interventions were composed to active or inactive controls. Currently evidence concerning whether physical exercise intervention reduce DTC or alter the self selected dual task strategy during unobstructed walking is greatly lacking mainly due to the failure of studies to measure and report reciprocal dual task effects on the non gait task.

Plummer.S (2016) conducted a study on to investigate the effects of physical exercise interventions on gait related Dual task interference in older adults. A systematic review and Meta analysis. Dual task interference during walking can substantially limit mobility and increase the risk of falls among community dwelling older adults. Previous systematic reviews examining interventions effect on dual task gait and mobility have not assessed relative dual task costs or investigated whether there is difference in treatment related changes based on the type of dual task or the type of control group. The purpose of this systematic review was to examine the effects of physical exercise intervention on older adults. Randomized, non randomized, and uncontrolled studies published in English and involving older adults were studied as a cognitive additional task when the task less balance during

the additional cognitive and motor tasks were compared, it was observed that the duration of completing the test increased at a statistically significant level when both motor and cognitive additional task were added in Tug ($p<0.001$) on the other hand, it was observed that the durations of the test decreased when both additional motor and cognitive task were given. We consider that balance trainings must be given together with motor and cognitive task to older people.

Shin.SS et al, (2014) reviewed the balance and gait disorder is most common in elderly. This study investigated the effect of motor dual task balance program on balance and gait of elderly women to suggest a more effective balance exercise method. Twenty elderly Koreans women's who could walk independently were recruited from the community dwelling. The motor dual task balance group stood on an aero step and performed gym ball bouncing, catching and throwing the simple task balance training group merely stood on the aero step participants performed 45 minutes of training,2 times a week for 6weeks.Balance was measured using Textron. Gait variables were recorded on a gait ride walkway at self determined walking speed. The fall index of the experimental group was significantly lower than that the control group. Subject of the experimental group were aged 78.6+ 5.58 years (Mean +SD) and had a height of 147.71+ 6.11cm,body weight of 50.06 + 9.64kg and KMMSE score of 26.1+1.45 subject of control group were aged 79.8+3.58year and had a height of 146.17 + 5.28 cm body weight of 48.67+5.35 kg and KMMSE score of 25.4+ 0.97 the fall index value of the NDBT group was significantly better than the STB group and before training (p,0.05)The parameter of gait between the groups were significantly different in terms of step length , stride length, velocity and cadence between the groups ($p <0.05$) all the measured gait parameter of the

NDBT group were significantly improved following the training. This study related that we found that motor dual task balance training improved balance and walking ability.

Hiyamizo.M (2017) conducted a study to investigate the effect of dual task balance training in the elderly on standing postural control while performing a cognitive task. Participants 43 subjects all above 65 years old were enrolled in the study and were assigned randomly to either an experimental group (N= 22) or a control group (N=22) interventions subject in the experimental group were given strength a balance training while performing cognitive task simultaneously. Subjects in the control group were given strength and balance training only. The chair stand test, functional reach test, timed up and go test and trail making test were measured. The way length of the center gravity was measured. All measurements were collected at baseline and after the training period. There were no significant difference in functional reach test, timed up and go test and way length at base line and after training between the two groups. This study revealed that dual task training in elderly people improves their dual task performance during standing postural control.

Bergamin.M (2014) conducted a study on effect on exercise on dual task and balance on elderly in multiple disease condition. Investigations on how exercise and physical activity affect dual task performance in the elderly are growing rapidly due to the fact that dual task activities are common place with activities of daily living. Preliminary evidence has shown the benefit on DT balance through it is unclear to what extent the effect exercise has on Dual task performance in elderly subjects with a high risk of falls. Hence the objectives of this study was to critically

review the existing evidence of a potential relationship between exercise and improvement of state and dynamic balance, during Dual task conditions as well as secondary outcome in elderly subjects with different disease conditions. A systematic search using online database was performed to source document inclusion criteria. Source articles classified as randomized controlled trials, controlled trails and uncontrolled trails 17 studies met the eligibility criteria and were comprised of 12 RCTS, 3CT and 2 UT, and overall 13 studies supported exercise being effective to improve parameters of static and dynamic balance during single or DT conditions.

Literature related to gait.

Truelsen.T (2010) conducted a study on to investigate the effect of gait training and exercise programs on gait and balance in post stroke patient. The aim of this review is to evaluate studies about gait training and exercise intervention applied to patients following chronic stroke on gait and balance. The studies included in this review were random clinical trials including only chronic post stroke individuals that evaluated gait and balance outcome and with a PED or scale score> 7.0 eight studies were selected. The results suggest gait and balance will only be affected in chronic post stroke patients. If training sessions last at least 30 minutes are repeated three times a week and maintained for at least five weeks. Gait training affects how post stroke individuals walk. They will probably walk faster and with a lower risk of falling however it is unclear whether the consequence of these procedure affect the quality of life.

Liu.YC (2017) investigated effects of cognitive and motor dual task gait training on dual task gait performance in stroke. Participants (n = 28) were randomly

assigned to cognitive dual task gait training (CDTT), motor dual task gait training (MDTT), or conventional physical therapy (CPT) group. Participants in CDTT or MDTT group practiced the cognitive or motor tasks respectively during walking. Participants in CPT group received strengthening, balance, and gait training. The intervention was 30 min/session, 3 sessions/week for 4 weeks. Three test conditions to evaluate the training effects were single walking, walking while performing cognitive task (serial subtraction), and walking while performing motor task (tray-carrying). Parameters included gait speed, dual task cost of gait speed (DTC-speed), cadence, stride time, and stride length. After CDTT, cognitive-motor dual task gait performance (stride length and DTC-speed) was improved ($p = 0.021$; $p = 0.015$). After MDTT, motor dual task gait performance (gait speed, stride length, and DTC-speed) was improved ($p = 0.008$; $p = 0.008$; $p = 0.008$ respectively). It seems that CDTT improved cognitive dual task gait performance and MDTT improved motor dual task gait performance although such improvements did not reach significant group difference. Therefore, different types of dual task gait training can be adopted to enhance different dual task gait performance in stroke.

Falbo.S (2016) conducted the study on effects of Physical-Cognitive Dual Task Training on Executive Function and Gait Performance in Older Adults Physical and cognitive training seem to counteract age-related decline in physical and mental function. Recently, the possibility of integrating cognitive demands into physical training has attracted attention. The purpose of this study was to evaluate the effects of twelve weeks of designed physical-cognitive training on executive cognitive function and gait performance in older adults. Thirty-six healthy, active individuals aged 72.30 ± 5.84 years

were assigned to two types of physical training with major focus on physical single task (ST) training and physical-cognitive dual task (DT) training respectively. They were tested before and after the intervention for executive function (inhibition, working memory) through Random Number Generation and for gait (walking with/without negotiating hurdles) under both single and dual task (ST, DT) conditions. Gait performance improved in both groups, while inhibitory performance decreased after exercise training with ST focus but tended to increase after training with physical-cognitive DT focus. Changes in inhibition performance were correlated with changes in DT walking performance with group differences as a function of motor task complexity (with/without hurdling). The study supports the effectiveness of group exercise classes for older individuals to improve gait performance, with physical-cognitive DT training selectively counteracting the age-related decline in a core executive function essential for daily living.

Silsupadol (2006) reviewed that balance and gait disorders are most common in elderly. This study investigated the effect of motor dual task balance training program regarding balance and gait for people with stroke. Everyday life involves may dual task situations, in which a person needs to do two or more things simultaneously, walking while taking to someone walking through the supermarket and looking for a certain product, carrying a tray with food while walking without the ability to carry out these types of simultaneous movement are usually provided individually by physiotherapists, physical therapist or sports therapists. Group therapy is possible but the supervision of people in a group may be difficult, under

dual task conditions the risk of falling or losing balance is high, so the therapist must be able to protect, catch or save the person during the whole intervention. Exercise therapies usually take place one to five times a week for two to six weeks. We will include people above the age of 18years, regardless of sex, setting and duration of illness. Who have been clinically diagnosed with stroke? We will include RCTS with mixed population that meets our inclusion criteria when the data for people with stroke are available separately. Average age was 75.8 ± 78 years with 49% of participants being female. Participants improved significantly in all outcome measures including measures of dual task ability, present improvement from initial to discharge assessment was significantly greater of balance confidence fall risk and sensory integration than dual task ability.

Abreu.D (2015) effect of balance exercises on ankle motion during normal and dual-task gait in older adults, changes in the gait parameters are observed due to aging process and associated to the modifications of musculoskeletal aspects as the decrease of range of motion (ROM) of the ankle what can increase the tripping and falling events in the elderly. Besides, the gait stability is alters when it is associated to dual-task. Therefore, the improvement of postural stability during gait is necessary as an approach for falling prevention. However, considering the complex mechanism of postural control system is important to seek for an intervention that can improve multi components involved in this system in order to improve dynamic postural stability in the shortest possible time, increasing the adherence of elderly in the intervention. Analyze the effect of balance training on ankle dorsiflexion ROM during gait under single and dual task conditions in elderly. Methods: Randomized controlled Trial (TRIAL RBR3S9M65) approved by the Ethics Committee for

Research on Humans of the Clinical Hospital, FMRP-USP (HCRP N◦ 5372/10). Twenty-six older adults community-dwelling (66.76 ± 4.88 years) of Ribeirao Prato, Brazil were included. Participants walked under single (normal gait speed) and motor dual task conditions (normal gait speed concomitant with the transferring of 2 coins same in size from one pocket to another, as quickly as possible, with the dominant limb), using 8 cameras Quality's Pro-Reflex Opus 300. Two reflexive spherical markers (18 mm) were placed bilaterally for each foot placed 8 mm from the metatarsal heads, between the 2nd and 3rd heads and the heels. The participants started walking barefoot ina6m track. Each volunteer performed 3 trials for each task and the mean value of dorsiflexion peak of ankle ROM was used for statistical analysis. Participants were randomized into two groups: control group (n = 13) which has not performed the exercise protocol and supervised group (n = 13) which has performed the exercise protocol with supervision (20 sessions, twice a week, during 10 weeks). The intervention program has consisted in warm up, global stretching, dynamic balance training involving normal and dual-task gait associated to ankle motion. The Newman–Keuls test was used and the comparisons were done.

Literature related to dual task exercise

Courtney. D (2010) Conducted a study on to investigated the rehabilitation and dual task ability in older adults. Recent evidence suggests that an impaired ability to allocate attention to balance during dual task situation is a powerful predictor of falls. Increased difficulty under dual task conditions may result from cognitive or motor impairment or both. The goal of this study was to examine the extent to which standard of balance rehabilitation improves dual task ability. Patients were assessed initially and at discharge for balance related confidence, gait

speed, fall risk, sensory integration and dual task ability. Balance rehabilitation involved weekly sessions plus home for strengthening endurance, center of gravity control training, multisensory training and postural strategy training. Based on the available evidence there are inconsistent finding with regard to the cognitive benefits of sequential training in comparison to cognitive or exercise training alone. Regular exercise has been shown to provide some cognitive benefit in healthy and cognitively impaired older adults ,cognitive training and regular participation in mentally stimulating activities have also demonstrated to have positive effects on cognitive functions in older adults, specifically this review will include evidence from 29 randomized controlled trials and factorial and published up to December 2016 and will extend on previous reviews that have not delineated the specific benefit from simultaneous and sequential studies. Seventeen studies met the eligibility criteria and were comprised of 12 RCTS,3CTS and 2cts overall,13 studies supported exercise being effective to improve parameters of static and dynamic balance during single or dual task condition Despite the heterogeneity of pathologic conditions, exercise showed similar benefits to improve function in two areas ,neurological condition and frailty conditions the lack of a common method to assess DT performance limited the ability to compare different interventions directly.

Jamie L.Trait et.al, (2012) conducted a study on investigates the influence of sequential vs. simultaneous dual task exercise training on cognitive functions in older adults. However simultaneous or dual task training where cognitive and or motor training are performed simultaneously with exercise may offer greater

benefits. This review summary provides an overview of the effect of combined simultaneous Vs, sequential training on cognitive function in older adults.

Agmon.M (2012) conducted study on to investigate the effects of enhances fitness training on dual task walking in older adults. Decline in dual task walking performance is associated with increased risk of falls among older adults. The objective of this study is to determine whether 18hr of participation in enhance fitness evidence based group exercise program, improves dual task walking performance among community dwelling older adults. Twenty eight healthy community dwelling older adults were evaluated before participating in Elf and after 18hr of participation. Gait speed was evaluated under single task and dual tasks using the Tug (Timed up and go) and 1min walk test. Dual task costs (DTC) the relative cost of dual task performance, were calculated for both cognitive and motor tasks. Postural control and executive functions were evaluated as well. After 18 hr of EF, dual task walking performance improved, single task performance improved. The objectives of our study were to determine the effects of exercise training on the enhancement of balance and gait ability and reduction in falls for people with PD. We included 25 randomized control trials of a moderate methodological quality in our meta-analysis. The results showed positive effects of exercise intervention on enhancing balance and gait performance. (Hedges g= 0.303 over the short term in 24 studies and 0.419 over the long term in 12 studies in 12 p >0.5) and the longest follow up duration was 12 months. There was no evidence that training decreased the number of fallers over the short or long term(p> 0.5) The result of our meta regression and subgroup analysis showed that facility based training produced greater training effects on improving PD participants balance and gait ability.

Tait.JL (2017) conducted study on Influence of Sequential vs. Simultaneous Dual-Task Exercise Training on Cognitive Function in Older Adults. Emerging research indicates that exercise combined with cognitive training may improve cognitive function in older adults. Typically these programs have incorporated sequential training, where exercise and cognitive training are undertaken separately. However, simultaneous or dual-task training, where cognitive and/or motor training are performed simultaneously with exercise, may offer greater benefits. This review summary provides an overview of the effects of combined simultaneous vs. sequential training on cognitive function in older adults. Based on the available evidence, there are inconsistent findings with regard to the cognitive benefits of sequential training in comparison to cognitive or exercise training alone. In contrast, simultaneous training interventions, particularly multimodal exercise programs in combination with secondary tasks regulated by sensory cues, have significantly improved cognition in both healthy older and clinical populations. However, further research is needed to determine the optimal characteristics of a successful simultaneous training program for optimizing cognitive function in older people.

Liebherr.M (2016) investigated the study on Dual-tasking and aging—about multiple perspectives and possible implementations in interventions for the elderly. It is well known that dual-tasking is adversely affected by physiological degenerative processes. Furthermore, the completion of a secondary task while walking is frequently discussed as a key contributor for falls in the elderly. Age-related differences in both activated neural structures and human behavior are indicated in numerous previous studies. Besides a general overview of dual-tasking and aging, this article reviews studies aiming at improving gait or postural control in

older adults using dual- or multi-task interventions. Approximately, 130 parameters out of 17 illustrated studies presented significant changes after dual-task-specific interventions regarding gait, postural control/balance, and falls. On the one hand, the article at hand shows highly consistent results in all of the dual-task intervention studies analyzed, indicating significant improvements related to postural control, gait, falls, or the performance of a secondary task. On the other hand, the results represent a heterogeneous structure and a gap between theoretical aspects and practical use. To optimize the use of dual-task, a systematization of underlying tasks is inevitable and should be focused on in further research.

Volcker.C (2006) investigated the Effect of Motor Practice on Dual-Task Performance in Older Adults .The aim of this study was to determine the effects of motor practice on cognitive and motor performance in older adults under single- and dual-task conditions. Fourteen younger (19–28 years) and 12 older adults (67–75 years) performed a precision grip sine wave force-tracking and a working memory task under single- and dual-task conditions. Participants performed a pretest, 100 motor practice trials, and a post-test. In the force-tracking and cognitive task, young outperformed older adults. Motor practice improved force-tracking under single- and dual-task conditions for both groups. However, practice did not prevent a decline in motor performance for older adults when they moved from single- to dual-task conditions. After practice, older adults improved cognitive performance in dual-task conditions. Advances in age appear to be associated with a decrease in the ability to manage and coordinate multiple tasks, which remains after extended practice.

Yang.YR (2007) to examine the effectiveness of a dual-task–based exercise program on walking ability in subjects with chronic stroke. Single-blind randomized

controlled trial General community. Twenty-five subjects with chronic stroke who were at least limited community ambulatory subjects (a minimum gait velocity, 58cm/s).Participants were randomized into a control group (n=12) or experimental group (n=13). Subjects in the control group did not receive any rehabilitation training. Subjects in the experimental group underwent a 4-week ball exercise program. Gait performance was measured under single task (preferred walking) and tray-carrying task. Gait parameters of interest were walking speed, cadence, stride time, stride length, and temporal symmetry index. The experimental group showed significant improvement in all selected gait measures except for temporal symmetry index under both task conditions. In the control group, there were no significant changes over the 4-week period for all selected measures. There was a significant difference between groups for all selected gait variables except for temporal symmetry index under both task conditions. The dual-task–based exercise program is feasible and beneficial for improving walking ability in subjects with chronic stroke.

Gregory.MC (2016) conducted a study on dual-task gait training and aerobic exercise training improves cognition in older adults with early indications of cognitive Impairment, Executive functioning (EF) is susceptible to cognitive decline, and impaired EF has been linked with poor dual-task performance. Aerobic and cognitive training can independently benefit cognition, and preliminary evidence suggests that the concurrent delivery of these modalities may benefit EF. Thus, older adults at risk for cognitive impairment may achieve greater cognitive benefit from combined cognitive and aerobic exercise training. We conducted a 6-month, experimental case series that involved a cognitive-motor and aerobic exercise intervention for older adults without dementia (i.e. MOCA 27 and MMSE

>24). Participants completed 30 minutes of exercise each session on a Biodex GaitTrainer2 treadmill; 15 minutes of dual-task gait training and 15 minutes of moderate intensity aerobic exercise. Participants were assessed at baseline (V0) and intervention endpoint (V2: 6-months), and mean change in cognition (EF, processing speed, verbal fluency and memory) was assessed using one-way ANOVA. At baseline, participants [n¼57; (mean6SD) age: 7066 years; 61% female] had mean MOCA and MMSE scores of 2562 and 2961, respectively. Significant improvements following exercise training were observed in (1) processing speed: Trail Making Test A (seconds) (V0: 33.1610 vs. V2: 29.669, p¼0.013), digit symbol coding (correct responses) (V0: 57614 vs. V2: 61615, p<0.001); (2) verbal fluency (words): semantic fluency (V0: 2166 vs. V2: 2366p¼0.03),controlled oral word associations (V0: 1365 vs. V2:1765, p<0.001); and (3) memory (words): immediate recall(V0: 863 vs. V2: 1163, p¼0.02), delayed recall (V0: 86vs.V2: 1164, p<0.001). Changes in EF (Trail Making Test B) were not significant (p¼0.053,).

Conclusion

Researcher usually undertake a thorough literature review to familiarize themselves with that knowledge base preparation of written review as a optimal components of an original research study, although most of the activities are similar for types of review. A literature review also plays a role at the end of the study as researchers try to make sense of their findings. Review serves try to make sense of their findings. Review serves to classify concepts or issues. It also offers various ways in which they can be viewed and identifies areas for future investigation.

CONCEPTUALFRAME WORK

The frame work used in the study was based on wiedenbach's prescriptive theory. Wiedenbach's model of nursing provide as any person receiving help of some kind from the health care system. Help can include care, teaching and advice. In this nursing theory, a patient does not need to be ill or injured since health education qualifies someone as a patient.

Wiedenbach's prescriptive theory is based on three factors

The central purposes, prescription, realities.

- **CENTRAL PURPOSE**

The central purpose which the nurse recognizes an essential to the particular discipline.

In this study central purpose is to improve balance and gait pattern among elderly.

- **PRESCRIPTION**

Prescription is the fulfillment of the central purposes.

In this study prescription is an intervention, dual task exercises given to the elderly.

- **OUTCOME**

Outcome is the improvement or achievement of goal.

In this study outcome is the improvement in balance and gait pattern among elderly.

- **REALITIES**

The realities in the immediate situation that influence the central purposes they are Agent, Recipient, Goal, Means, and Frame work.

In these study realities is the researcher, elderly, improvement in balance and gait, structured dual task training, old age homes.

1) AGENT

A Person who acts on behalf of another person or group.

In this study agent is a researcher.

2) RECIPIENT

A person or thing that receives or is awarded something.

In this study recipient is the elderly.

3) MEANS

Means is an action or system by which a result is achieved.

In this study mean is a structured dual task training given to the elderly.

4) FRAME WORK

Frame work means an essential supporting structure of the study.

In this study frame work is a selected old age homes.

5) GOAL

A goal is an idea of the future or desired result that a person or a group of people envisions, plans and commits to achieve.

In this study goal is the improvement in balance and gait.

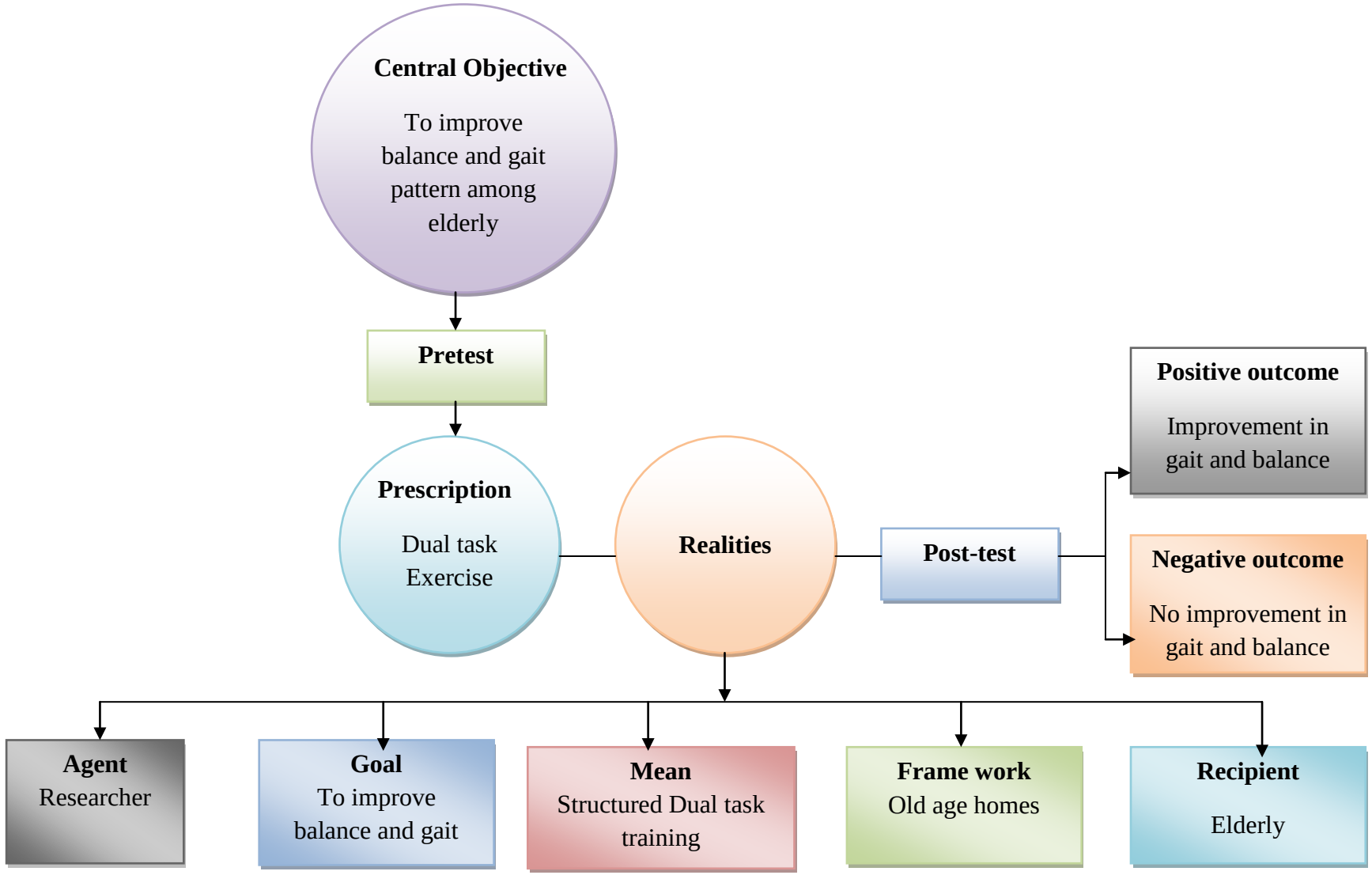

Figure 1: Conceptual frame work based on Wiedenbach's prescriptive theory (1969)

CHAPTER-III

METHODOLOGY

Research is a way to solve the research problem systematically. This chapter deals with the various steps that are generally adopted by a researcher in studying one's problem with the logic behind them (Kothari, 1990). Since the main objective of research is to build the body of knowledge to the existing one. It is to try out new nursing interventions to establish appropriate strategies to solve the existing health problem. This chapter included the research approach, research design, the setting of the study, population, sample and sampling technique, data collection procedure and plan for data analysis.

Research approach

A quantitative approach was adapted to assess the effectiveness of dual task exercises among elderly.

Research Design

Research design is the overall plan for obtaining answers to the questions being studied for handling some of the difficulties encountered during research process (Polit.D, 2008). In this study, pre-experimental one group pretest- post-test design was used.

Setting of the study

Setting is the physical location and conditions in which data collection takes place in the study. The study was conducted at DM convent old age home, Pilankalai in Kanyakumari district and DM convent old age home at Matthar in

Kanyakumari district. Both are governed by Roman Catholic Diocese, Kottar. The total number of inmates in DM convent old age home, Pilankalai was 63. It was approximately 10 kms away from the Christian College of Nursing, Neyyoor. The total number of inmates in DM convent old age home at Matthar was 30. It was governed by Roman Catholic Diocese, Kottar. It was approximately 20kms away from the Christian College of Nursing, Neyyoor.

Variables under study

Variables are qualities, properties and characteristics of person, things or situations that change or vary.

In this study, the three types of variables identified were:

- ✓ Independent variable
- ✓ Dependent variable
- ✓ Extraneous variable

Independent variable

An independent variable is the variable that stands alone and is not dependent on any other.

In this study, the independent variable was the dual task exercises.

Dependent variables

Dependent variable is the response, behavior or outcome that the researcher wants to predict or explain.

In this study, the dependent variables were the balance and gait of elderly.

Extraneous variables

Any uncontrolled variable that greatly influence the results of the study is called as an extraneous variable.

In this study, the extraneous variables include age, sex, income, religion, education, marital status, previous occupation, exercise pattern and health information medias, which would influence the dependent variables.

Population

Population is the total number of people who meet the criteria, the researcher has established for a study, from which the subjects will be selected and to whom the findings will be generalized.

In this study, the population included all the people aged above 60 years residing in DM convent old age homes at Pilankalai and Matthar in Kanyakumari district.

Sample

Sample is the subset of population elements, which are the most basic units about which data are collected. In the present study, the sample included 30 elderly persons between the age of 60 and 80 years, who had mild to moderate balance and gait problem.

Sampling technique

Sampling is the process of selecting a portion of the population to represent the entire population so that inferences about the population can be made. In order to achieve the objectives of the study, the investigator adopted non probability

sampling method with purposive sampling technique to select the sample from selected old age home.

In this study, total of thirty elderly (20 samples from DM convent old age home, Pilankalai and 10 from DM convent old age home, Matthar) were selected. All elderly people who fulfilled the inclusion criteria were selected as sample by using purposive sampling technique.

Criteria for sample selection

Inclusion criteria

Elderly people those who

Were staying in old age home

- Could speak in Tamil?
- Were willing to participate in the study?
- Had mild to moderate gait and balance problem.

Exclusion criteria

Elderly people who

- Were not willing to participate in the study.
- Did not know to communicate in Tamil.
- Had severe gait problem.
- Not able to follow instruction.
- Was on treatment for any other medical conditions such as myocardial infarction, cerebrovascular accident.

Description of tool

The data collection tools consisted of 3 sets of item.

SectionA: Demographic data consisted of age, sex, education, previous occupation, marital status, religion, income, exercise pattern, and health information medias.

Section B: The Berg Balance Scale was used to assess the balance which consisted of 14 items. Each item was scored from 0 to 4. The minimum attainable score was 0 and maximum score was 56. High score indicated low risk of fall. The total score was interpreted as follows.

0-20	High fall risk
21-40	Medium fall risk
41-56	low fall risk

Section C: The gait was assessed using Functional Gait Assessment Scale. The scale consisted of 10 items. Each item was scored from 0 to 3. The minimum attainable score was 0 and maximum score was 30. High score indicated normal gait. The total score was interpreted as follows

0 -10	Severe impairment
11 -20	Moderate impairment
21-30	Mild impairment
30	Normal

Content validity of the tool:

The content validity of the tool was checked by obtaining opinion from five experts from the field of Medicine, Medical Surgical Nursing, Physiotherapy and Statistics.

Reliability

Reliability is the degree of consistency or dependability with which an instrument or its designed to measure (polite 2008). In this study reliability of the tool was assessed by test-retest method. According to Karl Pearson coefficient method, the reliability of the tool was analyzed and found that the reliability of the questionnaire was r =0.79.

Pilot study

A pilot study was conducted to assess the feasibility of the study. Permission was obtained from the Director of old age home at Matthar, Kanyakumari district. Three elderly people were selected for pilot study by using purpose sampling method. The pilot study finding revealed that the study was feasible and practical.

Data collection procedure

The main study was conducted for 4 weeks. The study was conducted at DM Convent Old age Home at Pilankalai and DM Convent Old age Home at Matthar. After getting formal permission from the Director of the old age homes, data were gathered. Each day the researcher interviewed about 3-4 elderly people based on the inclusion criteria. The interview lasted for 30-40 minutes for a sample. The data was collected in three phases.

Phase I: The investigator introduced herself to attribute it is and developed rapport with the elderly. After explaining the purpose of the study, the investigator obtained oral consent from elderly people. The demographic variables of the elderly were collected by face to face interview using structured questionnaires. The gait and balance of elderly were assessed using Berg Balance Scale and Functional Gait Assessment Scale.

Phase II: Dual task exercises were administered to individually twice in a week for 4 weeks. There were 4 session of training. Each session lasted for 30minutes.

I Session – Number counting while forward walking

II Session - Number counting while backward walking

III Session - Walking between obstacles

IV session – Figure of Eight Walking,

After teaching to the elderly, they were allowed to practice under the supervision of the investigator for 4 weeks.

Phase III: Post-test was done on 5th week of data collection using Berg balance Scale and Functional Gait Assessment Scale.

Plan for Data analysis

The data analysis was analyzed according to the objectives and hypotheses of the study by using descriptive statistics and inferential statistics.

Ethical consideration

- The study was conducted after the approval of the dissertation committee of Christian College of Nursing, Neyyoor.
- Formal permission was obtained to conduct the study from the Director of the old age home at Pilankalai and Matthar, to conduct the study.
- Oral consent was obtained from the elderly after explaining the purpose of the study.

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

The data themselves do not provide answer to research questions. So the data need to be processed and analyzed in an orderly coherent fashion. After the analysis they must be interpreted. Interpretation is the process of making sense of the results and examining their implication (Polite D, 2008). This chapter deals with the analysis and interpretation of data to assess the effectiveness of dual task exercise on improving gait and balance among elderly. The data obtained are classified, grouped and analyzed based on the objectives of the study.

The data obtained were analyzed according to the objectives.

1. To assess the pre and post- test level of balance and gait pattern among elderly.
2. To compare the pretest and post- test level of balance and gait pattern among elderly after dual task exercise.
3. To associate selected demographic variables of elderly with pretest level of balance and gait pattern

Study findings represented as follows.

SectionA: Distribution of subjects according to the selected demographic characteristics.

Section B: Distribution of samples according to the balance pattern score

Section C: Distribution of samples according to the level of gait pattern score.

SectionD: Association between the balance pattern and selected demographic variables.

Section E: Association between the gait pattern and selected demographic variables.

Section A

Table-1: Description of the senior citizen staying in the old age homes according to their demographic variables.

Serial No	Demographic profiles	Components	Frequency	%
1.	Age group (years)	60-64	13	43.3
		65-69	8	26.7
		70-74	5	16.7
		75-79	4	13.3
2.	Gender	Male	18	60.0
		Female	12	40.0
3	Education	School	29	96.7
		UG	1	3.3
		Laborer	3	10.0
4	Previous Occupation	Private	19	63.3
		Govt.	6	20.0
		Others	2	6.7
5	Religion	Hindu	10	33.3
		Christian	20	66.7
7	Information sources	TV	19	63.3
		Paper	11	36.7
8	Marital status	Married	26	86.7
		Unmarried	4	13.3
9	Exercise pattern	Regular	3	10.0
		None	27	90.0

The above table-1 depicts the demographic variables of elderly people staying in the old age homes. Among them, the maximum of (43.3%) were in the age bracket of 60-64 years. The male and females were 60% and 40%. In respect of their educational status, 96.7% of them had studied in the school level. Maximum of 63.3% of them had worked in the private sector. In respect of religion, 66.7% were Christians. Cent percent of the subjects' had income <5000 per month. The information sources of them were TV 63.3% and paper 36.7%. Regarding the marital status, 86.7% were married and the remaining 13.3% were unmarried. Majority (90%) of the subjects had exercise pattern as none.

Section B

This section deals with the distribution of samples according to balance and gait score

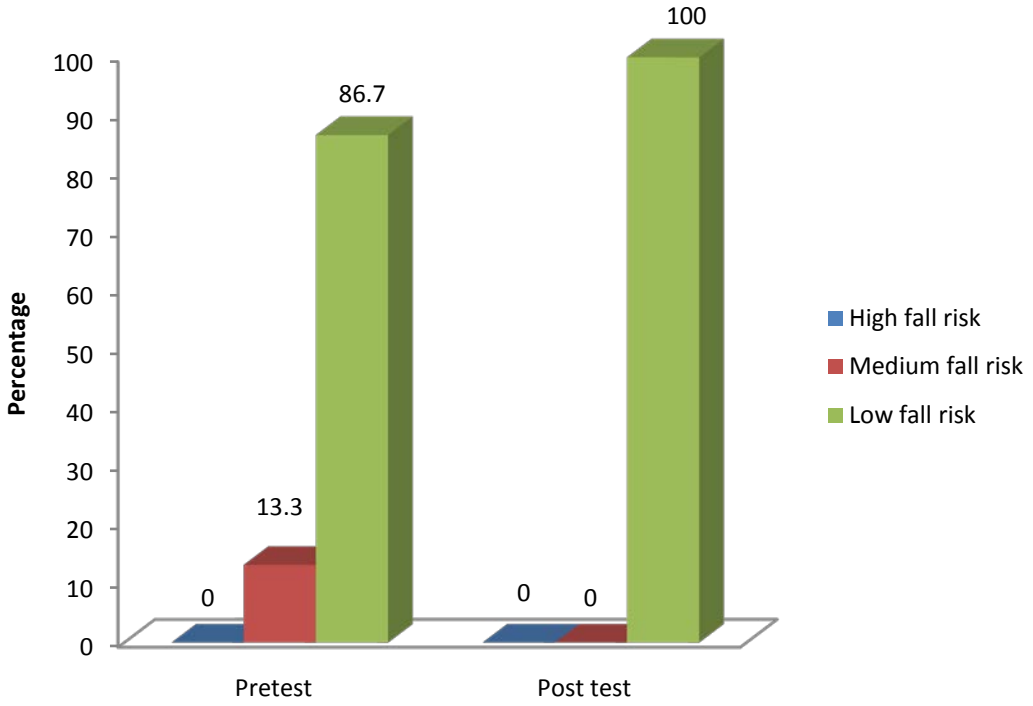

Figure-2 Distribution of samples score according to balance

The Figure- 2 showed the Berg Balance Scale on exercise in pre and post-test. At pre test, 86.7% of subjects had high fall risk and 13.3% had medium fall risk. At post-test, cent percent of subjects had low fall risk.

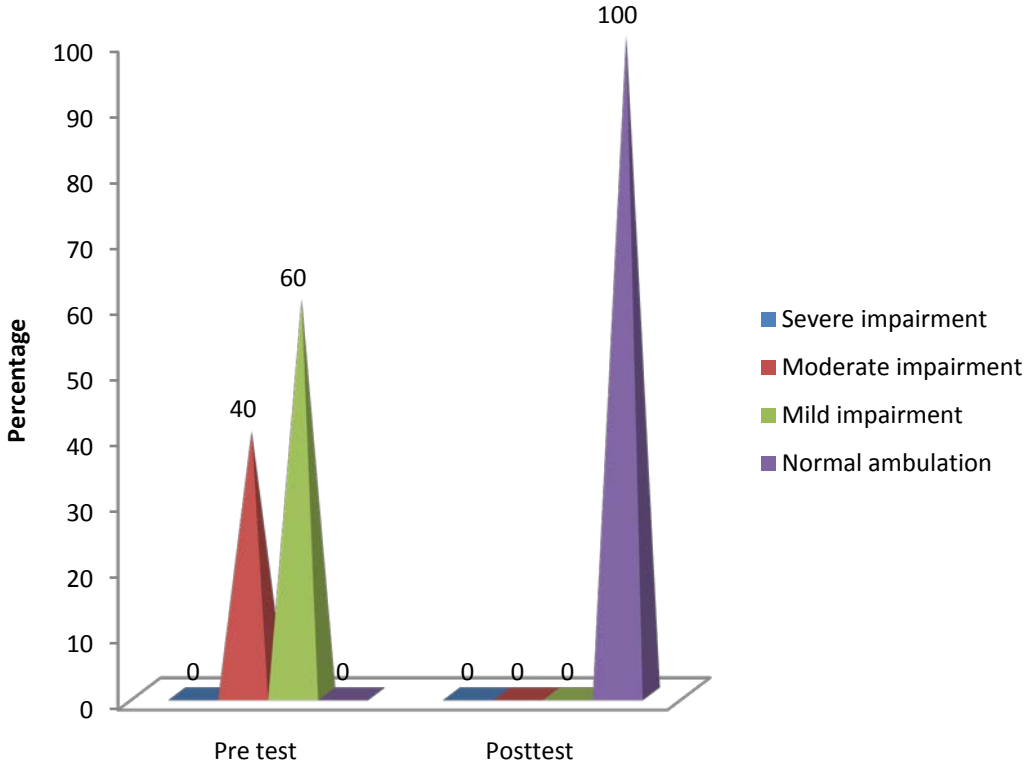

Figure 3: Distribution of samples according to Gait score

The Figure-3 states the assessment of impairments level of gait at pre and post –test levels. During pre test, 40% of them had moderate impairment and 60% of them had mild impairment. In post- test, all the subjects had normal ambulation.

Table-4: Effectiveness of dual task exercise on improving balance and gait pattern:

N=30

Scale	Pre test		Post test		Improvements		"t"	df	Sig
	Mean	SD	Mean difference	SD	Mean difference	SD			
BBS	17.9	2.5	52.4	2.3	34.5	3.6	53.227	29	P<0.001
FGAS	12.0	3.3	28.4	2.2	16.4	4.3	20.756	29	P<0.001

The table-4 states the effectiveness of dual task exercise in both scales. The BBS at pre test was 17.9±2.5 and at post- test was 52.4±2.3. The improvement was 34.5± 3.6 and it was statistically highly significant (P<0.001). The FGAS at pre test was 12.0±3.3. The post-test means FGAS was 28.4±2.2. The improvements from pre to post was 16.4±4.3 and it was statistically very highly significant (P<0.001). Hence research hypothesis (H1) was accepted.

Table 5 Association between demographic variables with Berg Balance Scale

N=30

variables	<median no	%	>median no	%	Chi square	df	significance
Age group							
60-64	5	16.7	8	26.7	1.222	1	0.231
65+	10	33.3	7	23.3			
Gender							
Male	9	30	9	30			
Female	6	20	6	20	0.000	1	1.000
Education							
Schools	15	50	14	46.7	0.000	1	1.000
UG	0	0	1	3.3			
Occupation							
private	9	30	13	43.3	1.534	1	0.215
Govt	6	20	2	6.7			
Religion							
Hindu	5	16.7	5	16.7	0.000	1	1.000
Christian	10	33.3	10	33.3			
Information source							
TV	12	40.0	7	23.3	2.297	1	
Paper	3	10.0	8	26.7			0.128
Marital status							
Married	12	40.0	14	46.7	0.288	1	0.598
Un married	3	10.0	1	3.3			
Exercise pattern							
Regular	2	6.7	1	3.3	0.000	1	1.000
None	13	43.3	14	46.7			

Table 5 depicted that there was no association between age, gender, education, occupation, marital status, religion and information sources and Berg Balance score. Hence the research hypothesis (H2) was rejected.

Table 6 Association between demographic variables with FGAS

N=30

S. No	Characteristics	Moderate		Mild		Chi square	df	significance
		No	%	No	%			
1	**Age group**							
	60-64	5	16.7	8	26.7	0.000	1	1.000
	65+	7	23.3	10	33.3			
2	**Sex**							
	Male	8	26.7	10	33.3	0.052	1	0.709
	Female	4	13.3	8	26.7			
3	**Education**							
	Schools	12	40.0	17	56.7	0.000	1	1.000
	UG	0	0.0	1	3.3			
4	**Occupation**							
	Private	11	36.7	11	36.7	2.053	1	0.099
	Govt	1	3.3	7	33.3			
5	**Religion**							
	Hindu	5	16.7	5	16.7	0.156	1	0.461
	Christian	7	23.3	13	43.3			
6	**Information sources**							
	TV	8	26.7	11	36.7	0.000	1	1.000
	Paper	4	13.3	7	23.3			
7	**Exercise pattern**							
	Regular	2	6.7	1	3.3	0.000	1	1.000
	None	10	33.3	17	56.7			

Table 6 depicted that there was no association between age, gender, education, occupation, marital status, religion, exercise pattern and information sources and functional gait assessment score. Hence the research hypothesis (H2) was rejected.

CHAPTER - V

RESULTS AND DISCUSSION

The main aim of the study was under taken to assess the effectiveness of dual task exercise among elderly people to improve gait and balance pattern in a selected old age home at Kanyakumari district. The study was conducted in DM convent old age home Pilankalai and DM convent old age home, Matthar. Totally 30 samples were selected for the study. The elderly person is balance and gaits were assessed by using Berg Balance Scale and Functional Gait Assessment Scale.

The objectives of the study are

1. To assess the pre and post-test level of balance and gait pattern among elderly.
2. To compare the pretest and post-test level of balance and gait pattern among elderly after dual task exercise.
3. To associate selected demographic variables with pretest level of balance and gait pattern.

Sampling characteristics

Table I shows that, among 30 elderly people majority (43.3%) were in the age between 60 and 64 years. About 60% of them were male and 96.7% of them had school education. Regarding previous occupation 63.3% of them were coolies and 66.7% of them belonged to Christian by religion. Almost 66.3 % of them were getting information through TV and 36.7% through paper. Regarding the marital status 86.7% were married.

These study finding were supported by a study done by a Falbo.S (2016) describes the majority elderly age were between 72.30 ± 5.84.

The study finding is also supported by the study done by Sertal.M (2014) who described that the elderly were between the age group of 65 to 80 years.

From the above finding it was evident that the elderly who were having balance and gait problem were between the age group of 60 and 80 years.

The first objectives of the study was to assess the pre and post-test level of balance and gait pattern

The investigator in the present study found that in pretest, 86.7% of elderly had high fall risk and 13.3% had medium fall risk where as in post-test 100% of them were in low fall risk. Regarding the gait, in pretest 40% of them had moderate impairment and 60% elderly had mild impairment whereas in post-test all of them had normal ambulation.

The finding is in line with another study done by Silsupadal (2006) where the elderly who participated in dual task exercise improved significantly in all outcome measures. There was a significantly greater balance confidence fall risk and sensory integration.

The second objectives of the study were to compare the pretest and post-test level of balance and gait among elderly.

The investigator found that at pretest 86.7% of subjects had high fall risk whereas in post-test 100% subject had low fall risk. The pretest mean Berg Balance Score was 17.9 ± 2.5 and the post- test score was 52.4 ± 2.3 with't' value 53.227 (p<

.001). The mean gait pretest score was 12.0 ± 3.3 and post- test score was 28.4 ± 2 with 't' value 20.756 ($p < .001$).

The finding is supported by the study done by Shin S (2014) which described that KMMSE score of 25.4 ± 97 the fall index value of the NDBT group was significantly better than the STB group. The study revealed that motor dual task balance training improved balance and walking ability.

These results support that, the dual task training program was effective in improving balance and gait pattern. So the research hypothesis (H_1) was accepted and concluded that the dual task exercise was effective in improving gait and balance of elderly.

The third objectives of the study was to determine the association between the level of balance and gait among elderly with selected demographic variables

Association between the balance and demographic variables with pretest level of balance was calculated using chi-square test. There was no association between demographic variables such as age, gender, education, religion, previous occupation, marital status and information Medias with pretest value of balance. These findings of the study were consistent with the study of done by Lee I (1992) reported that there was no significant relationship between demographic variables of elderly with Berg Balance Scale score.

Association between the balance and demographic variables with pretest level of gait was calculated using chi-square test. There was no association between demographic variables such as age, gender, education, religion, previous occupation, marital status, exercise pattern and information need with pretest score of gait.

The findings of the statement of McNamara (2004) say that education Medias, previous occupation and proper guidance and dual task exercise may help the elderly to improve balance and gait pattern.

These finding were also supported by the study done by the Hiyamizo.M (2017) which describes that there were no significant difference in functional reach test, timed up and go test and way length at base line and after training between the two groups.

CONCLUSION

In conclusion, the study finding reports that 40% of them had moderate impairment in pretest and in 60% of them had mild impairment and where as post-test 100% had normal ambulation. The mean pretest Berg Balance Score was 17.9 ±2.3 and at post-test was 52.4 ± 2.3. The mean pretest Functional Assessment Score was 12.0±3.3 and the post-test mean was 28.4 ± 2.2. This support that the dual task training program was effective in improving balance and gait among elderly. The study revealed that, there was no association between pretest level of balance and selected demographic variables and there was no association between gait and demographic variables.

CHAPTER VI

SUMMARY, CONCLUSION, IMPLICATION, AND RECOMMENDATION

This chapter deals with summary of the study and conclusion drawn. It clarifies the limitation of the study and implication. The recommendation is given in different areas like nursing practice, nursing education, nursing administration and nursing research.

Summary

The study was carried out with a view to assess the effectiveness of dual task exercises on improving the balance and gait pattern among elderly people in a selected old age homes at Kanyakumari District.

The following objectives were formulated for the study

1. To assess the pre and post-test level of balance and gait pattern among elderly.
2. To compare the pretest and post-test level of balance and gait pattern among elderly after dual task exercise.
3. To associate selected demographic variables with pretest level of balance and gait pattern.

The following hypotheses were set for the study. The entire hypotheses were tested at 0.05 level of significance.

H1: There will be significant difference between the pretest and post-test level of balance and gait pattern among elderly.

H2: There will be significant association between selected demographic variables with pretest level of balance and gait pattern among elderly.

The purpose of the study was to assess the effect of dual task exercises to improve balance and gait pattern among elderly at selected old age home in Kanyakumari district. The study was conducted in DM convent old age home Pilankalai and DM convent old age home Matthar. Purposive sampling technique was adopted. Samples were selected on the basis of inclusion criteria. Samples used were 30 elderly people. The data collection tools developed for generating the data were Berg Balance Scale for balance and Functional Gait Assessment scale to assess gait. The study was based on the Wiedenbanch's prescriptive theory. The research design adapted for this study was one group, pretest and post-test pre-experimental design. The feasibility of the study and the refinement of tools were assessed through pilot study. The data collection for the main study was done from 22.1.18 to 3.3.18. Statistical analysis was done by using both descriptive and inferential statistics.

FINDINGS OF THE STUDY

Among 30 elderly, majority (43.3%) were between the age of 60 and 64 years. About 60% of them were male and 96.7% of them had school education. Regarding previous occupation 63.3% of them were coolies and 66.7% of them belonged to Christian by religion. Almost 66.3 % of them were getting information

through TV and 36.7% through paper. Regarding the marital status 86.7%were married.

SIGNIFICANT FINDINGS OF THE STUDY

- Majority of the elderly people (86.7%) had high fall risk in pretest with the mean Berg Balance Score of 17.9 ± 2.5. During post-test 100% had low fall risk with the mean Functional Gait Assessment Score of 12.0 ± 3.3.

- About 40% of the elderly had moderate gait impairment in pretest. The mean Functional Gait Assessment Score was 12.0 ± 3. During post-test 100% had normal ambulation with Functional Gait Assessment Score 28.4 ± 2.2.

- The pretest mean Berg Balance Score was 17.9 ±2.5 and the post-test mean score was 52.4±2.3. The mean difference was high with the‘t’ value of 53.227. It was statistically significant.

- The pretest mean Functional Gait Assessment Score was 12.0 ± 3.3 and the post-test score was 28.4 ± 2.2. The mean difference was high and the‘t’ value was 20.756 which was statistically significant.

- There was no significant association between the pretest level of balance and demographic variables like age, sex, education, religion, previous occupation, marital status, income, exercise pattern and health information medias.

- There was no significant association between the pretest level of gait score with demographic variables like age, sex, education, religion, previous occupation, marital status, income, exercise pattern and information medias.

IMPLICATION

The finding of the present study has important implications in the field of nursing practice, nursing education, nursing research and nursing administration. The study has several implications for the following fields.

IMPLICATION FOR NURSING PRACTICE

- Encourage the researchers, to set long term goals regarding balance and gait pattern to achieve the goal.
- The study will emphasize in reducing the balance and gait problem.
- During hospitalization, the nurse should educate the dual task exercise to elderly.
- Continuing education program me can be planned for nurses regarding dual task exercise to update their knowledge.

IMPLICATION FOR NURSING EDUCATION

- Educating the student nurses, trained nurses the importance of dual task exercises among elderly help them to implement in clinical setting.
- Conduct seminars, workshop, conferences, symposium, and microteaching programs regarding dual task exercises among elderly.

IMPLICATION FOR NURSING ADMINISTRATION

- Nurse administration can function effectively among elderly, and can select different old age home, assess the balance and gait pattern and they can organize dual task training sessions in the old age homes. This will help resolving their balance and gait problem.

- Provide fund for conducting seminars, workshops and conference regarding balance and gait problem among elderly.
- Announce the coping mechanism through Medias, Posters, Charts, Pamphlets and Handouts.

IMPLICATIONS FOR NURSING RESEARCH

- This study finding can be utilized for literature review by the researchers.
- The nurse administrator should motivate to do more research in this aspect.
- Encourage the researcher, to set long term goals regarding balance and gait.

RECOMMENDATION

Based on the findings of the study the investigator proposed the following recommendation for the further study.

- Similar study can be conducted with large sample of elderly.
- The study can be conducted with different groups of elderly in the community.
- A longitudinal study can be conducted on the same topic.
- A descriptive study can be conducted to identify balance and gait problem of the elderly.
- The study can be done with large number of samples for better generalization.
- In-service education may be conducted continuously to improve balance and gait pattern among elderly.

CONCLUSION

In this study purposive sampling technique adopted**.** The result support that, the dual task training program was effective in improving balance and gait pattern. So the dual task exercise was effective in improving gait and balance of elderly.

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APPENDIX -I

LETTER SEEKING PERMISSION TO CONDUCT THE STUDY

CHRISTIAN COLLEGE OF NURSING

C.S.I. KANYAKUMARI DIOCESE

(Affiliated to the Tamil Nadu Dr. M.G.R. Medical University, Chennai)

Approved by Indian Nursing Council, New Delhi and Tamil Nadu Nurses and Midwives Council, Chennai

NEYYOOR -629802

KANYAKUMARI DISTRICT, TAMIL NADU, INDIA

Principal

Dr. (Mrs.) Santhi Appavu, M.Sc.(N), M.Phil.(N)., Ph.D.(N)

Phone : Per : 04651 - 221599, Off : 04651 - 221411

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E-mail : ccnneyyoor@gmail.com

Web : www.ccnneyyoor.org

Date.....16.02.2018.....

13/M.Sc.(N)/2018

To
The Director,
Oldage Home,
Pilankalai.

Respected Sir,

Sub: Requisition for getting permission to do Pilot Study for a Research project – Reg.

This is to introduce **Stalin Shiny V**, II Year M.Sc. Nursing student of this College. She is to conduct a research project as a partial fulfillment of University requirements for the award of M.Sc. degree in Nursing.

Topic:

"A study to assess the effectiveness of dual task exercise on impressing balance and gait pattern among elderly in selected oldage home at Kanyakumari District.

This student is in need of your esteemed help and guidance as she is interested in conducting her study in your well esteemed hospital.

This is to request you to kindly extend necessary facilities to her work on her proposed study during the month of February 2018.

Thanking you,

Yours Sincerely,

PRINCIPAL
CHRISTIAN COLLEGE OF NURSING
NEYYOOR-629 802
K.K.DIST.TAMILNADU
SOUTH INDIA

Sr. Rita Francis

HOME FOR THE AGED
PILANKALAI
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KANYAKUMARI - 629 166
TAMIL NADU (INDIA

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APPENDIX – II

LETTER REQUESTING OPINION AND SUGGESTION FROM EXPERT ON CONTENT VALIDITY OF THE TOOL

From,

Mrs.V.Stalin shiny,

II Year M.Sc.

Christian college of nursing.

Neyyoor.

To

Respected Sir/ Madam

Sub:M.Sc Nursing programme-Dissertation validation of study tool request-reg.

Mrs.V.Stalin shiny, a bonafideII Year M.Sc(N) student of Christian College of Nursing, Neyyoor is approaching you to obtain validation of her study tool pertaining to her dissertation in partial fulfillment of the requirements for the degree of Master of Science in Nursing. The selected topic is "A study to assess the effectiveness of dual task exercise on improving balance and gait pattern among elderly in selected old age home at Kanyakumari District." In this regards I humbly request you to kindly extent possible technical guidance and support for successful completion of dissertation.

Thanking You

Yours Faithfully

Enclos:

1. Research proposal
2. Tool Section A: Demographic data (Tamil/English)

Section B: Berg Balance Scale and Functional Gait Assessment Scale.

APPENDIX – III

LIST OF EXPERTS WHO HAVE DONE VALIDATION OF THE TOOL

1. Prof. Dr.Christoper Nesamoni, MBBS.,MD

   Medical consultant,

   C.S.I Mission Hospital,

   Neyyoor

2. Mrs.C.S.Prabha Jein, MPT

   Physiotherapist(ortho)

   C.S.I.Mission Hospital,

   Neyyoor.

3. Mrs. D. Nesalin Suji, M.Sc (N)

   Lecturer,

   C.S.I. College of Nursing,

   Marthandam.

4. Mrs. C.R. Merlin Suja, M.Sc (N)

   Lecturer,

   C.S.I. College of Nursing,

   Marthandam.

5. Mrs. Y. Vinitha Bai, M.Sc (N)

   Lecturer,

   C.S.I. College of Nursing,

   Marthandam.

6. Mrs. C.Ajitha Rethnam, M.Sc (N)

   Vice Principal/Professor

   Sree Mookambika College,

   Kulasekharam.

7. Mrs.S.Adlin Shinija,M.Sc(N),Ph(d)

   Principal,

   Annammalcollege of nursing,

   Kulithurai

APPENDIX –IV

CERTIFICATE OF TOOL VALIDATION

This is to certify that the tool constructed by Mrs.V.Stalin shiny, II Year M.Sc Nursing, Christian College of Nursing, Neyyoor, “A study to assess the effectiveness of dual task exercises on improving balance and gait pattern among elderly in selected old age home at kanyakumari district. The study has been validated by me and can be used for data collection.

My comments on the following tool

- Adequacy of tool to measure objectives
- Organization of the tool
- Feasibility of the tool.

Signature :

Name :

Designation :

College :

Place :

EVALUATION CRITERIA CHECKLIST FOR DEMOGRAPHIC VARIABLES

VALIDATION FOR RESEARCH TOOL

Instructions

The expert is requested to go through the following criteria for evaluations. Four columns are given for response and a column for remarks. Kindly place tick mark in the appropriate column and given remarks.

Interpretation of Column

Column I : Very relevant.

Column II : Relevant.

Column III : Need modification.

Column IV : Not relevant.

Remarks

1 Demographic date

2. Berg Balance Scale

3. Functional Gait Assessment Scale.

Item	Very relevant	Relevant	Need modification	Not relevant	Remarks
Demographic variables					
Berg balance scale					
Functional gait assessment scale					

Signature Name :

Designation :

Address :

Signature of the expert

APPENDIX – V

RESERACH TOOLS

SECTION-A

Demographic variables

1) **Age**

1) 60–64years ( )

2) 64– 69 years ( )

3) 70- 74years ( )

4) 75-79years ( )

2) Gender

1) Male ( )

2) Female ( )

3) Education

1) School ( )

2) Under graduate ( )

3) Post graduate ( )

4) Previous occupation

1) Coolie ( )

2) Private ( )

3) Government job ( )

5) **Religion**

1) Hindu ( )

2) Muslim ( )

3) Christian ( )

6) Income

1) Below Rs.5000 ( )

2) Rs.6000– 10000 ( )

3) Rs. 10000 and above ( )

7**) Health information Medias**

a) Television ( )

b) Radio ( )

c) Newspaper ( )

8) Marital status

1) Married ( )

2) Un married ( )

9) **Exercise pattern**

1) Regular exercise ( )

2) None ( )

பிரிவு - அ

புள்ளிவிவரபட்டியல்

1. வயது

- 60 – 64 ( )
- 65 – 69 ( )
- 70 – 74 ( )
- 75 – 79 ( )

2. பாலினம்

- ஆண் ( )
- பெண் ( )

3. கல்வித் தகுதி

- பள்ளிபடிப்பு ( )
- பட்டதாரி ( )
- மேல்நிலைபட்டதாரி ( )

4. மாத வருமானம்

- ஆயிரம் ( )
- ஆயிரம் முதல் ஐந்தாயிரம் ( )
- ஐந்தாயிரத்திற்குமேல் ( )

5. முந்தைய வேலை

- கூலி ( )
- தனியார் ( )
- அரசுவேலை ( )

6. திருமண நிலை

- திருமணம் ஆனவர் ( )
- திருமணம் ஆகாதவா ( )

7. ஆரோக்கியம் சார்ந்த தகவல் ஊடகம்

- தொலைக்காட்சிபெட்டி ( )
- வானொலி ( )
- செய்தித்தாள் ( )

SECTION B

Berg Balance Scale

_____ Date: _____

Location: _____ Rater: _____

ITEM DESCRIPTION SCORE (0-4)

Sitting to standing _____

Standing unsupported _____

Sitting unsupported _____

Standing to sitting _____

Transfers _____

Standing with eyes closed _____

Standing with feet together _____

Reaching forward without stretched arm _____

Retrieving object from floor _____

Turning to look behind _____

Turning 360 degrees _____

Placing alternate foot on stool _____

Standing with one foot in front _____

Standing on one foot _____

Total _____

General instruction

Please document each task and/or give instructions as written. When scoring, please record the lowest response category that applies for each item. In most items, the subject is asked to maintain a given position for a specific time. Progressively more points are deducted if:

- the time or distance requirements are not met
- the subject's performance warrants supervision
- the subject touches an external support or receives assistance from the examiner

The subject should understand that they must maintain their balance while attempting the tasks. The choices of which leg to stand on or how far to reach are left to the subject. Poor judgment will adversely influence the performance and the scoring.

Equipment required

- stopwatch or watch with a second hand,
- a ruler or other indicator of 2, 5, and 10 inches.
- Chairs used during testing should be a reasonable height.
- Either a step or a stool of average step height may be used for item # 12.

Berg Balance Scale

1. SITTING TO STANDING

Instructions: Please stand up; try not to use your hand for support.

( ) 4 able to stand without using hands and stabilize independently

( ) 3 able to stand independently using hands.

( ) 2 able to stand using hands after several tries

( ) 1 needs minimal aids to stand and stabilize

( ) 0 needs moderate or maximal assist to stand

2. STANDING UNSUPPORTED

Instruction: Please stand for two minutes without holding on

( ) 4 able to stand safely for two minutes

( ) 3 able to stand 2 minutes with supervision

( ) 2 able to stand 30 seconds unsupported

( ) 1 needs several tries to stand 30 seconds unsupported.

( ) 0 unable to stand 30 seconds unsupported.

3. SITTING WITH BACK UNSUPPORTED BUT FEET SUPPORTED ON FLOOR OR ON A STOOL

Instruction: Please set with arms folded for 2 minutes.

( ) 4 able to sit safely and securely for 2 minutes.

( ) 3 able to sit 2 minutes under supervision

( ) 2 able to able to sit 30 seconds

( ) 1 able to sit 10 seconds

( ) 0 unable to sit without support 10 seconds.

4. STANDING TO SITTING

Instruction: Please sit down

( ) 4 sits safely with minimal use of hands

( ) 3 controls descent by using hands

( ) 2 uses back of legs against chair to control descent.

( ) sit independently but has uncontrolled descent

( ) 0 needs assist to sit

5. TRANSFERS

Instructions: Average chairs for pivot transfer. Ask subject to transfer one way toward a seat with interest and one way toward a seat without arm rest. You may use two chairs or a bed and a chair.

( ) 4 able to transfer safely with minor use of hands.

( ) 3 able to transfer safely definite need of hands.

( ) 2 able to transfer with verbal cuing and supervision

( ) 1 needs one person to assist

( ) 0 needs two people to assist or supervise to be safe.

6. STANDING UNSUPPORTED WITH EYES CLOSED

Instruction: Please close your eyes and stand still for10 seconds

( ) 4 able to stand 10 seconds safely

( ) 3 able to stand 10 seconds with supervision

( ) 2 able to stand 3 seconds

( ) 1 unable to keep eyes closed 3 seconds but stays safely.

( ) 0 needs help to keep from falling

7. STANDING UNSUPPORTED WITH FEET TOGETHER

Instruction: Place your feet together and stand without holding on

( ) 4 able to place feet together and stand without holding on

( ) 3 able to place feet together independently and stand 1 minute safely.

( ) 2 able to place feet together independently and stand 1 minute with supervision.

( ) 1 needs help to attain position but able to stand 15 seconds feet together.

( ) 0 needs help to attain position and unable to hold for 15 seconds.

8. REACHING FORWARD WITH OUTSRETCHED ARM WHILE STANDING

Instruction: Lift arm to 90 degrees stretch out your fingers and reach forward as for as you can. (Examiner places a ruler at the end of fingertips when arm is at 90 degrees. Fingers should not touch the ruler while reaching forward. The recorded measure is the distance forward that the fingers reach while the subject is in the most forward lean position; when possible ask subject to use both arms when reaching to avoid rotation of the trunk)

( ) 4 can reach forward confidently 25cm (10 inches)

( ) 3 can reach forward 12cm (5 inches)

( ) 2 can reach forward 5 cm (2 inches)

( ) 1 reaches forward but needs supervision

( ) 0 loses balance while trying requires external support.

9. PICKUP OBJECT FROM THE FLOOR FROM A STANDING POSITION

Instruction: Pick up the shoe slipper which is in front of your feet.

( ) 4 able to up slipper safely and easily.

( ) 3 able to pick up slipper but needs supervision

( ) 2 unable to pick up but reaches 2-5cm (1-2 inches) from slipper and keeps balance independently.

( ) 1 unable to pick up and needs supervision while trying.

( ) 0 unable to try needs assist to keep from losing balance or falling.

10. TURNING TO LOOK BEHIND OVER LIFT AND RIGHT SHOULDERS WHILE STANDING

Instructions: Turn to look directly behind you over toward the left shoulder, Repeat to the right.

( ) 4 looks behind from both sides and weight shift well.

( ) 3 looks behind one side only other side shows less weight shift.

( ) 2 turn sideways only but maintain balance.

( ) 1 needs supervision when running.

( ) 0 needs assist to keep from losing balance or falling.

11. PLACE ALTERNATIVE FOOT ON STEP OR STOOL WHILE STANDING UNSUPPORTED

Instruction: Place each foot alternatively on the step or stool. Continue each foot has touched the step, stool for times

( ) 4 able to stand independently and safely and complete 8 steps in 20 seconds.

( ) 3 able to stand independently and complete 8 steps in> 20 seconds.

( ) 2 able to complete 4 steps without aid with supervision.

( ) 1 able to complete > 2 steps needs minimal assist.

( ) 0 needs assistance to keep from falling, unable to dry.

12. TURNS 360 DEGREES

Instruction: Turn completely around in full circle. Turn a full circle in the other direction.

( ) 4 able to turn 360 degrees safely in 4 seconds or less.

( ) 3 able to turn 360 degrees safely onside only 4 seconds or less.

( ) 2 able to turn 360 degrees safely but slowly.

( ) 1 needs close supervision or verbal cuing.

( ) 0 needs assistance while turning.

13. STANDING UNSUPPORTED ONE FOOT INFRONT

Instruction: Place one foot in front of the other.

( ) 4 able to place foot tandem independently and hold 30 seconds.

( ) 3 able to place foot ahead independently and hold 30 seconds.

( ) 2 able to take small step independently and hold 30 seconds.

( ) 1 needs help to step but can hold 15 seconds.

( ) 0 loses balance while stepping or standing.

14. STANDING ON ONE LEG

Instruction: Stand on one leg as long as you can without holding on

( ) 4 able to lift leg independently and hold> 10 seconds.

( ) 3 able to lift leg independently and hold 5-10 seconds.

( ) 2 able to lift leg independently and hold 2-3 seconds.

( ) 1 tries to lift leg unable to hold 3 seconds but remains standing Independently.

( ) 0 unable to try of needs assist to prevent fall.

Cut-off scores for the elderly were reported by Berg et al 1992 as follows:

- A score of 56 indicates functional balance.
- A score of < 45 indicates individuals may be at greater risk of falling.

Interpretation

41-56 = Low fall risk

21-40= Medium fall risk

0-20 = High fall risk

SECTION C

Functional Gait Assessment Scale

A marked 6-m (20-ft) walkway that is marked with a 30.48-cm (12-in) width.

1. GAIT LEVEL SURFACE

Instructions: Walk at your normal speed from here to the next mark (6 m [20 ft.]). Grading: Mark the highest category that applies.

(3) Normal-Walks 6 m (20 ft.) in less than 5.5 seconds, no assistive devices, good speed, no evidence for imbalance, normal gait pattern, deviates no more than 15.24 cm (6 in) outside of the 30.48-cm (12-in) walkway width.

(2) Mild impairment-Walks 6 m (20 ft.) in less than 7 seconds but greater than 5.5 seconds, uses assistive device, slower speed, mild gait deviations, or deviates 15.24 –25.4 cm (6 –10 in) outside of the 30.48-cm (12-in) walkway width.

(1) Moderate impairment-Walks 6 m (20 ft.), slow speed, abnormal gait pattern, evidence for imbalance, or deviates 25.4 – 38.1 cm (10 -15 in) outside of the 30.48-cm (12-in) walkway width. Requires more than 7 seconds ambulating 6 m (20 ft.).

(0) Severe impairment-Cannot walk 6 m (20 ft.) without assistance, severe gait deviations or imbalance, deviates greater than 38.1 cm (15 in) outside of the 30.48-cm (12-in) walkway width or reaches and touches the wall.

2. CHANGE IN GAIT SPEED

Instructions: Begin walking at your normal pace (for 1.5 m [5 ft.]). When I tell you "go," walk as fast as you can (for 1.5 m [5 ft.]). When I tell you "slow," walk as slowly as you can (for 1.5 m [5 ft.]). Grading: Mark the highest category that applies.

(3) Normal-Able to smoothly change walking speed without loss of balance or gait deviation. Shows a significant difference in walking speeds between normal, fast, and slow speeds. Deviates no more than 15.24 cm (6 in) outside of the 30.48-cm (12-in) walkway width.

(2) Mild impairment-Is able to change speed but demonstrates mild gait deviations, deviates 15.24 –25.4 cm (6 –10 in) outside of the 30.48-cm (12-in) walkway width, or no gait deviations but unable to achieve a significant change in velocity, or uses an assistive device.

(1) Moderate impairment-Makes only minor adjustments to walking speed, or accomplishes a change in speed with significant gait deviations, deviates 25.4 –38.1 cm (10 –15 in) outside the 30.48-cm (12-in) walkway width, or changes speed but loses balance but is able to recover and continue walking.

(0) Severe impairment-Cannot change speeds, deviates greater than 38.1 cm (15 in) outside 30.48-cm (12-in) walkway width, or loses balance and has to reach for wall or be caught.

3. GAIT WITH HORIZONTAL HEAD TURNS

Instructions: Walk from here to the next mark 6 m (20 ft.) away.

Begin walking at your normal pace. Keep walking straight; after 3 steps, turn your head to the right and keep walking straight while looking to the right. After 3 more steps, turn your head to the left and keep walking straight while looking left. Continue alternating looking right and left every 3 steps until you have completed 2 repetitions in each direction.

Grading: Mark the highest category that applies.

(3) Normal-Performs head turns smoothly with no change in gait. Deviates no more than 15.24 cm (6 in) outside 30.48-cm (12-in) walkway width.

(2) Mild impairment-Performs head turns smoothly with slight change in gait velocity (eg, minor disruption to smooth gait path), deviates 15.24 –25.4 cm (6 -10 in) outside 30.48-cm (12-in) walkway width, or uses an assistive device.

(1) Moderate impairment-Performs head turns with moderate change in gait velocity, slows down, deviates 25.4 –38.1 cm (10 –15 in) outside 30.48-cm (12-in) walkway width but recovers, can continue to walk. (0) Severe impairment-Performs task with severe disruption of gait (e.g., staggers 38.1 cm [15 in] outside 30.48-cm (12-in) walkway width, loses balance, stops, or reaches for wall).

4. GAIT WITH VERTICAL HEAD TURNS

Instructions: Walk from here to the next mark (6 m [20 ft.]). Begin walking at your normal pace. Keep walking straight; after 3 steps, tip your head up and keep walking straight while looking up. After 3 more steps, tip your head down, keep walking straight while looking down. Continue alternating looking up and down every 3 steps until you have completed 2 repetitions in each direction. Grading: Mark the highest category that applies.

(3) Normal-Performs head turns with no change in gait. Deviates no more than 15.24 cm (6 in) outside 30.48-cm (12-in) walkway width.

(2) Mild impairment-Performs task with slight change in gait velocity (e.g., minor disruption to smooth gait path), deviates 15.24 -25.4 cm (6 -10 in) outside 30.48-cm (12-in) walkway width or uses assistive device.

(1) Moderate impairment-Performs task with moderate change in gait velocity, slows down, deviates 25.4 –38.1 cm (10 –15 in) outside 30.48-cm (12-in) walkway width but recovers, can continue to walk. (0) Severe impairment-Performs task with severe disruption of gait (e.g., staAppendix.

5. GAIT WITH NARROW BASE OF SUPPORT

Instructions: Walk on the floor with arms folded across the chest, feet aligned heel to toe in tandem for a distance of 3.6 m [12 ft.]. The number of steps taken in a straight line is counted for a maximum of 10 steps. Grading: Mark the highest category that applies.

(3) Normal-Is able to ambulate for 10 steps heel to toe with no staggering.

(2) Mild impairment-Ambulates 7-9 steps.

(1) Moderate impairment-Ambulates 4 -7 steps.

(0) Severe impairment-Ambulates less than 4 steps heel to toe or cannot perform without assistance.

6. GAIT WITH EYES CLOSED

Instructions: Walk at your normal speed from here to the next mark (6 m [20 ft.]) with your eyes closed. Grading: Mark the highest category that applies

(3) Normal-Walks 6 m (20 ft.), no assistive devices, good speed, no evidence of imbalance, normal gait pattern, deviates no more than 15.24 cm (6 in) outside 30.48-cm (12-in) walkway width. Ambulates 6 m (20 ft) in less than 7 seconds.

(2) Mild impairment-Walks 6 m (20 ft.), uses assistive device, slower speed, mild gait deviations, deviates 15.24 -25.4 cm (6 -10 in) outside 30.48-cm (12-in) walkway width. Ambulates 6 m (20 ft.) in less than 9 seconds but greater than 7 seconds.

(1) Moderate impairment-Walks 6 m (20 ft.), slow speed, abnormal gait pattern, evidence for imbalance, deviates 25.4 -38.1 cm (10 -15 in) outside 30.48-cm (12-in) walkway width. Requires more than 9 seconds ambulating 6 m (20 ft.).

(0) Severe impairment-Cannot walk 6 m (20 ft.) without assistance, severe gait deviations or imbalance, deviates greater than 38.1 cm (15 in) outside 30.48-cm (12-in) walkway width or will not attempt task.

7. AMBULATING BACKWARDS

Instructions: Walk backwards until I tell you to stop.

Grading: Mark the highest category that applies.

(3) Normal-Walks 6 m (20 ft.), no assistive devices, good speed, no evidence for imbalance, normal gait pattern, deviates no more than 15.24 cm (6 in) outside 30.48-cm (12-in) walkway width.

(2) Mild impairment Walks 6 m (20 ft.), uses assistive device, slower speed, mild gait deviations, deviates 15.24 -25.4 cm (6 -10 in) outside 30.48-cm (12-in) walkway width.

(1) Moderate impairment-Walks 6 m (20 ft.), slow speed, abnormal gait pattern, evidence for imbalance, deviates 25.4 -38.1 cm (10 –15 in) outside 30.48-cm (12-in) walkway width.

(0) Severe impairment-Cannot walk 6 m (20 ft.) without assistance, severe gait deviations or imbalance, deviates greater than 38.1 cm (15 in) outside 30.48-cm (12-in) walkway width or will not attempt task.

8. STEPS

Instructions: Walk up these stairs as you would at home (i.e., using the rail if necessary). At the top turn around and walk down. Grading: Mark the highest category that applies.

(3) Norma-Alternating feet, no rail.

(2) Mild impairment-Alternating feet, must use rail.

(1) Moderate impairment-Two feet to a stair; must use rail.

(0) Severe impairment-Cannot do safely.

TOTAL SCORE: _____ MAXIMUM SCORE 30.

INTERPRETATION

0= Severe impairment

1 = Moderate impairment

2 = Mild impairment

3 = Normal ambulation

SECTION D

DUAL TASK EXERCISES

Introduction

The two tasks could be performed independently as a single task and have distinct and separate goals in separate goals. In a dual task intervention , people practice both tasks of interest in this review is an exercise intervention that aims to improve gait or balance .The dual task based exercise program is feasible and beneficial for improving walking ability in elderly.

Definition

Dual task training is defined as the ability to perform two or more cognitive and motor activities simultaneously while maintaining postural control.

Steps:

- **I**ntroduce yourself
- Invite the elderly to sit down
- Address the elderly by name
- Invite the elderly to do exercise
- Instruct the elderly to any difficulties inform immediately and stop the procedure

PROCEDURE

There are four exercises

- ✓ Number counting while forward walking
- ✓ Number counting while back ward walking
- ✓ walking between obstacles
- ✓ Figure of eight walking

1. Number counting while forward walking

A marked 6-m (20ft) walkway that is marked with a 30-48cm width using chalk powder.

Instruct the elderly to walk forward from here to the next mark 6m (20ft) and count numbers 1to 10 while walking. Begin walking at your normal pace. Keep walking straight forward until I tell you to stop. Walk at your normal speed from here to the next mark (6 m [20ft.]).

2. Number counting while backwards walking

Instruct the elderly to count the numbers 1 to 10 and walk backward until I tell you to stop. Walk at your normal speed from here to the next mark (6 m [20ft.]).

3. Walking between obstacles

Keep bricks between the walkway each at 1 feet distance. Instruct the elderly to walk between obstacles (bricks).

4. Figure of eight walking

Draw a figure of eight picture using chalk powder. Instruct the elderly to walk inside the figure of eight picture.

பிரிவு -இ

இரட்டைபணிபயிற்சி

முன்னுரை

இரண்டு விதமான உடற்பயிற்சிகளை ஒரே நேரத்தில் செய்வதாகும். இதற்கு தனித்தனியான நோக்கம் உண்டு. இதனை சுயமாக ஒரே நேரத்தில் ஒருவர் செய்வதாகும். இப்படி செய்வதன் மூலம் உடற்தள்ளாட்டம் இல்லாம் சமநிலையில் நடக்கலாம். இதன் முக்கிய நோக்கம் நடையை நேராக நடக்க உதவுதல் ஆகும்.

வரையறை

இரட்டை பணி பயிற்சி என்பது ஒரே நேரத்தில ் இரண்டு விதமான உடற்பயிற்சிகளை செய்தல்.

படிகள்

- நம்மை அறிமுகப்படுத்துதல்
- முதியவரை உட்காரவைத்தல்
- பெயர்களை சொல்லி அழைத்தல்
- முதியவரைஅழைத்து உடற்பயிற்சி சொல்லி கொடுத்தல்

வழிமுறை

நான்கு உடற்பயிற்சிகள் உள்ளன.

1. எண்களை சொல்லி கொண்டே முன்னோக்கி நடத்தல்
2. எண்களை சொல்லி கொண்டே பின்னோக்கி நடத்தல்
3. தடைகளை தாண்டி நடத்தல்
4. எட்டு வடிவ படத்தினுள் நடத்தல்

1. எண்களை சொல்லிக் கொண்டே முன்னோக்கி நடத்தல்

முதியவரிடம் ஒன்று முதல் பத்து வரை நம்பரை சொல்லிக் கொண்டே முன்னோக்கி நடக்க சொல்லுதல்

2. எண்களை சொல்லிக் கொண்டே பின்னோக்கி நடத்தல்

முதியவரிடம் ஒன்று முதல் பத்து வரை நம்பரை சொல்லி கொண்டே பின்னோக்கி நடக்கசொல்லுதல்.

3. சரியாக தடையை தாண்டி நடத்தல்

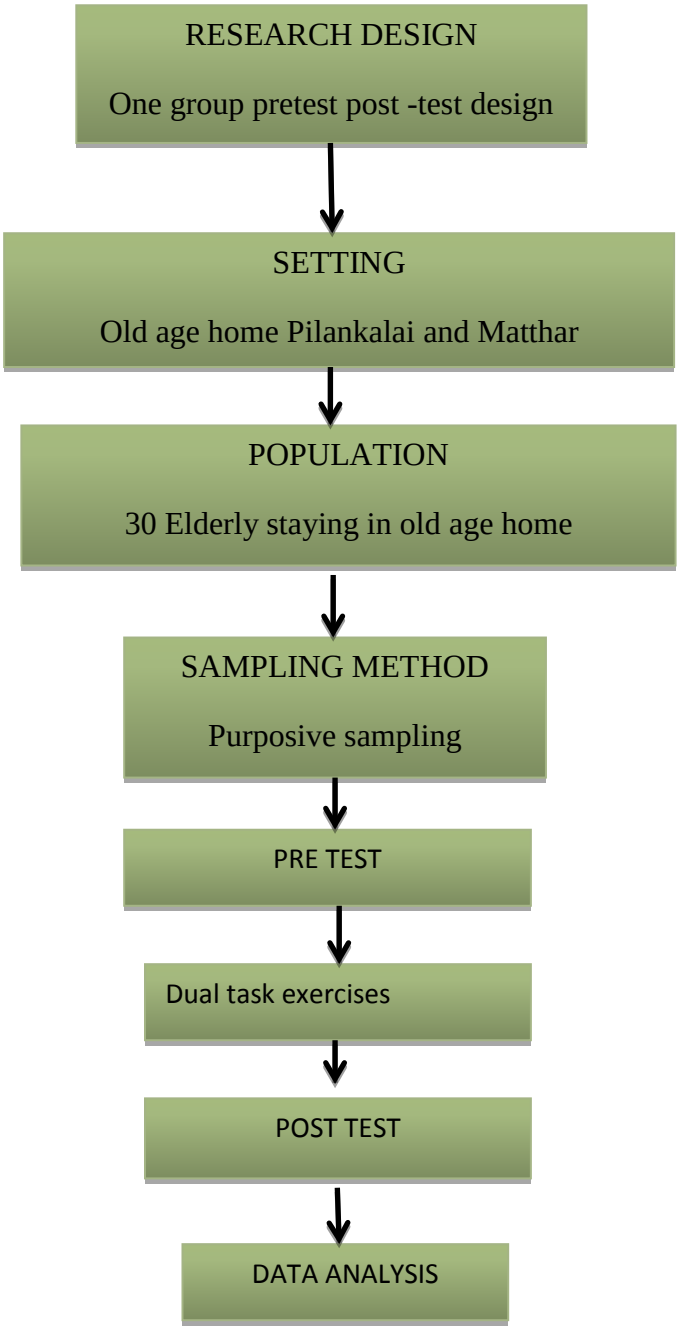
முதியவரிடம் சரியாக தடையை தாண்டி நடக்க சொல்லுதல்

4. எட்டு போன்ற வடிவமான படத்தில் நடத்தல்

முதியவரிடம் எட்டு வடிவமான படத்தின் உள்ளே நடக்க சொல்லுதல்.

APPENDIX – VI

SHEMATIC REPRESENTATION OF STUDY DESIGN



APPENDIX-VII

ETHICAL CLEARANCE CERTIFICATE

Dear, Mrs.V.Stalin shiny

Sub: Your letter dated 5-06-2017 for approval of the above reference study and its related documents.

Ref: “A study to assess the effectiveness of dual task exercises on improving balance and gait pattern among elderly in selected old age homes at Kanyakumari District”. Ethics committee of Christian College of Nursing, Neyyoor reviewed and discussed the study proposal document submitted by you related to the content of the above referenced study and its meeting held on 5-06-2017. The following ethical committee members were present at the meeting held on 5-06-2017.

S.No Name Profession Position in the Committee

S.No	Name	profession	Position in the committee
1.	Dr.SanthiAppavu	Nursing	Chairman
2.	Dr.RajeshSathya	Medical	Basic medical scientist
3.	Prof. Beaula Christa Bell	Medical	Clinician
4.	Adv.DishoreJayananth	Legal	Legal expert
5.	Mr. Jeya Kumar	Social	Social Scientist
6.	Dr. SharmilaJansi Rani	Management	Philosopher/Ethicist
7.	Er. Anand Paul GnanaJerin	Lay person	Community Person

After due ethical and scientific consideration, the Ethics committee has approved above presentation submitted by you.

With Regards,

Date: 5-06- 2017

Place: Neyyoor

Dr. Santhi Appavu,

Ethics Committee Chairperson, Christian College of Nursing, Neyyoor.